^{68}Ga-PET: a powerful generator-based alternative to cyclotron-based PET radiopharmaceuticals

Melpomeni Fani [a], João P. André [b] and Helmut R. Maecke [a]

PET (positron emission tomography) is a powerful diagnostic and imaging technique which requires short-lived positron emitting isotopes. The most commonly used are accelerator-produced ^{11}C and ^{18}F. An alternative is the use of metallic positron emitters. Among them 68Ga deserves special attention because of its availability from long-lived 68Ge/68Ga generator systems which render ^{68}Ga radiopharmacy independent of an onsite cyclotron. The coordination chemistry of Ga^{3+} is dominated by its hard acid character. A variety of mono- and bifunctional chelators have been developed which allow the formation of stable ^{68} Ga^{3+} complexes and convenient coupling to biomolecules. ^{68}Ga coupling to small biomolecules is potentially an alternative to ^{18}F- and ^{11}C-based radiopharmacy. In particular, peptides targeting G-protein coupled receptors overexpressed on human tumour cells have shown preclinically and clinically high and specific tumour uptake. Kit-formulated precursors along with the generator may be provided, similar to the ^{99}Mo/^{99m}Tc-based radiopharmacy, still the mainstay of nuclear medicine.

Keywords: gallium-68; generator; nuclear probes; PET

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